

COOPERATIVE SWEET SORGHUM
VARIETY TESTS FOR SIRUP
DURING 1972
IN FOUR SOUTHEASTERN STATES

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COOPERATIVE SWEET SORGHUM VARIETY TESTS FOR SIRUP DURING 1972 IN FOUR SOUTHEASTERN STATES

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ABSTRACT

Ten varieties of sweet sorghum, *Sorghum bicolor* (L.) Moench, were evaluated for sirup production at four or more locations. Two hybrids, '1845E' (male sterile 'Williams' \times 'Brandes') and 'GA 710 Sy' (male sterile 'Williams' \times 'Wiley'), were superior in stalk and sirup yield to all other varieties in the Florida and Georgia tests. However, 'GA 710 Sy' is no longer recommended for sirup production because of excessive lodging and extreme height, which makes harvesting difficult. 'Mer. 67-9' was vigorous and productive but was irregular in height and maturity. 'Mer. 67-10', a uniform, superior variety for ease of harvesting, was very attractive in appearance, but it failed to produce sirup of desirable quality at Lorman, Miss. Diseases of economic importance were rough spot in Florida and Georgia and gray leaf spot in Mississippi. **KEY WORDS:** excessive lodging, harvesting difficulties, recommended for sirup, sirup production, sirup quality, *Sorghum bicolor* (L.), superior stalk and sirup yield.

INTRODUCTION

Experimental plots for testing 10 sweet sorghum varieties, *Sorghum bicolor* (L.) Moench, for sirup production were planted in 4 Southeastern States—Alabama, Florida, Georgia, and Mississippi. All tests included 'Brandes' (the standard), 'Dale', 'Mer. 67-9', 'Mer. 67-10', 'Mer. 67-11', 'Mer. 67-18', and 'Mer. 70-3'. Three hybrid varieties, 'GA 710 Sy' (male sterile 'Williams' \times 'Wiley'), '1845E' (male sterile 'Williams' \times 'Brandes'), and '1984E' (male sterile 'Williams' \times 'Dale') were planted only in Florida and Georgia.³

METHODS

A randomized complete-block design with four replications of each variety was used. Each plot included three rows. The seed in most tests were planted with hill-drop planters, and the plants were thinned to three or four per hill. In the remaining tests, the seed were drilled with a spout drill, and the plants were thinned to 6- to 8-inch spacing. The plots were cultivated with conventional tractor cultivators. All sorghum varieties were harvested when the seed were in the dough stage of maturity.

At harvest, all stalks from the center row of each plot were weighed to determine gross yield. A 10- to 20-stalk sample was randomly selected, then weighed, stripped, topped, and finally reweighed to determine the net tons of millable stalks per acre.

Each stalk sample was crushed at the mill to provide a sample for calculating juice extraction and to provide juice for Brix and sucrose

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analyses. Sirup was processed from a 5-kg composite of juice samples for each variety. The sirup from each variety was weighed in order to calculate the percentage of sirup for determining the yield per net ton of stalks and yield per acre. Three 2-oz, clear-glass bottles were filled with sirup of each variety to provide samples for observation, quality, grading, and response to storage.

RESULTS AND DISCUSSION

Table 1 shows yield of stripped stalks. 'Brandes', the standard variety, averaged 15.6 tons of stalks per acre and ranged from 8.4 to 27.2 tons per acre. 'Mer. 67-9', 'GA 710 Sy', and '1845E' exceeded 'Brandes' by 18, 33, and 53 percent.

Table 2 shows the extraction of juice. 'Brandes' stalks averaged 43.8 percent and ranged from 37.2 to 49.1 percent. 'Mer. 67-18' stalks contained the most juice, producing 17 percent more juice than 'Brandes'.

Table 3 gives degrees Brix of extracted juice. 'Brandes' juice averaged 20.2 Brix. 'Dale' and 'Mer. 70-3' had higher Brix readings than 'Brandes' at all locations except Verona, Miss. The remaining test varieties showed greater variation from the standard at different locations. All varieties had low Brix readings at Blairsville, Ga., but only 'Brandes' had comparatively lower readings at Meridian and Newton, Miss.

Table 4 shows yield of sirup per net ton of stalks. 'Brandes' averaged 15.1 gallons of sirup per ton of stalks. The hybrids, 'GA 710 Sy',

'1845E', and '1984E' exceeded 'Brandes' by 19, 17, and 12 percent in the Georgia tests. The overall average of 'Mer. 67-11', 'Mer. 67-9', 'Mer. 67-18', and 'Dale' exceeded the yield of 'Brandes' by 10, 10, 12, and 13 percent.

Table 5 shows the yield of sirup per acre. The yield at Cairo, Ga., was very poor because of early drought and heavy infestation by the lesser corn stalk borer. High yields were obtained at Meridian, Miss., where one irrigation reduced moisture stress, permitting continuous development of the plants. 'Mer. 70-3' produced sirup that was dark brown to reddish brown in color, and it was the only variety that failed to produce high-quality sirup. All other varieties produced a high-quality amber or light-straw-colored sirup.

Table 6 contains data on diseases of economic importance. Disease effects were evaluated on reductions in plant yield and quality and on percentage of leaf destruction. 'Honey', a variety highly susceptible to most leaf diseases, was planted on border rows to indicate presence of disease-causing organisms. Anthracnose, formerly a serious disease on sweet sorghum and a detriment to high-quality sirup, was completely absent in all varieties except 'Honey' because of genetic resistance. Rough spot infection was heavy on most varieties at Quincy, Fla., and at Blairsville and Experiment, Ga. Gray leaf spot infection was heavy at Lorman and Verona, Miss. Rust infection was present only at Meridian, Miss., and was limited to one variety, 'Mer. 67-11'. Insecticides caused no significant injury to the plants.

TABLE 1.—*Yield of stripped stalks*

Location	'Brandes' (tons/ acre)	Pct of 'Brandes'								
		'Dale'	'Mer. 67-9'	'Mer. 67-10'	'Mer. 67-11'	'Mer. 67-18'	'Mer. 70-3'	'GA 710 Sy'	'1845E'	'1984E'
Alabama: Crossville	15.9	91	122	102	96	109	82	...	...	...
Florida: Quincy	14.7	65	126	112	84	86	86	163	158	104
Georgia:										
Blairsville	15.3	66	110	69	60	65	47	165	153	118
Experiment	19.4	78	85	94	86	83	64	114	99	77
Cairo	8.4	67	94	110	69	59	81	120	206	120
Mean	14.4	70	96	91	72	69	64	133	153	105
Mississippi:										
Lorman	12.6	98	151	121	112	87	87	...	...	...
Meridian	27.2	89	126	109	107	108	109	...	...	...
Newton	13.0	85	126	120	95	67	81	...	...	...

TABLE 1.—*Yield of stripped stalks*—Continued

Location	'Brandes' (tons/ acre)	Pct of 'Brandes'								
		'Dale'	'Mer. 67-9'	'Mer. 67-10'	'Mer. 67-11'	'Mer. 67-18'	'Mer. 70-3'	'GA 710 Sy'	'1845E'	'1984E'
Mississippi—Continued:										
Verona	16.6	105	119	130	115	138	101	...	...	...
Mean	17.4	94	130	120	107	100	94	...	...	...
Mean of means	15.6	80	118	106	90	91	82	...	...	...

TABLE 2.—*Juice extraction*

Location	'Brandes' (pct)	Pct of 'Brandes'								
		'Dale'	'Mer. 67-9'	'Mer. 67-10'	'Mer. 67-11'	'Mer. 67-18'	'Mer. 70-3'	'GA 710 Sy'	'1845E'	'1984E'
Alabama: Crossville										
Crossville	22.8	103	89	98	96	85	102	...	...	...
Florida: Quincy	44.4	108	109	109	105	117	102	109	106	106
Georgia:										
Blairsville	49.1	99	102	104	98	107	93	105	106	98
Experiment	43.4	115	108	110	108	113	102	110	112	119
Cairo	42.3	113	101	109	105	107	99	118	113	111
Mean	44.9	109	104	108	104	109	98	111	110	109
Mississippi:										
Lorman	40.8	105	118	102	106	122	95	...	...	...
Meridian	45.5	97	99	90	95	124	96	...	...	...
Newton	37.2	110	116	86	90	124	103	...	...	...
Verona	40.6	116	112	111	109	129	107	...	...	...
Mean	41.0	107	111	97	100	125	100	...	...	...
Mean of means	43.8	106	109	104	101	117	97	...	...	...

TABLE 3.—*Brix analysis*

Location	'Brandes'	Pct of 'Brandes'								
		'Dale'	'Mer. 67-9'	'Mer. 67-10'	'Mer. 67-11'	'Mer. 67-18'	'Mer. 70-3'	'GA 710 Sy'	'1845E'	'1984E'
Alabama: Crossville										
Crossville	22.8	103	89	98	96	85	102	...	...	...
Florida: Quincy	20.0	112	97	103	99	96	102	113	106	104
Georgia:										
Blairsville	16.4	105	101	93	89	89	107			
Experiment	21.3	103	84	89	98	91	101			
Cairo	19.5	110	104	102	98	93	112			
Mean	19.1	106	96	95	95	91	107	104	100	101
Mississippi:										
Lorman	20.6	117	97	97	97	88	109	...	...	...
Meridian	16.9	115	109	131	124	102	106	...	...	...
Newton	16.9	128	115	120	116	106	118	...	...	...
Verona	21.9	93	88	87	85	80	93	...	...	...
Mean	19.1	113	102	109	106	94	104	...	...	...
Mean of means	20.2	108	96	101	99	92	104	...	...	...

TABLE 4.—Sirup yield per net ton of stalks

Location	'Brandes' (gal/ ton)	Pct of 'Brandes'								
		'Mer. 'Dale'	'Mer. 67-9'	'Mer. 67-10'	'Mer. 67-11'	'Mer. 67-18'	'Mer. 70-3'	'GA 710 Sy'	'1845E'	'1984E'
Alabama: Crossville	16.0	106	120	101	102	113	93	...	...	...
Florida: Quincy	16.0	108	109	109	134	116	104	136	106	106
Georgia:										
Blairsville	15.0	103	97	93	85	95	99	107	111	103
Experiment	15.3	114	99	101	117	110	101	116	127	116
Cairo	14.4	136	110	103	105	100	106	135	113	117
Mean	14.9	118	102	99	102	102	102	119	117	112
Mississippi										
Lorman	14.4	108	115	(1)	106	113	94	...	...	...
Meridian	12.5	119	106	114	118	130	105	...	...	...
Newton	11.6	132	116	96	98	126	111	...	...	...
Verona	15.9	108	92	100	91	106	89	...	...	...
Mean	13.6	117	107	78	103	119	100	...	...	...
Mean of means	15.1	113	110	97	110	112	100	...	...	...

¹ Failed to boil to sirup of proper density.

TABLE 5.—*Sirup yield per acre*

Location	'Brandes' (gal/acre)	Pct of 'Brandes'								
		'Mer. 'Dale'	'Mer. 67-9'	'Mer. 67-10'	'Mer. 67-11'	'Mer. 67-18'	'Mer. 70-3'	'GA 710 Sy'	'1845E'	'1984E'
Alabama: Crossville	255	97	146	103	98	124	76	...	...	...
Florida: Quincy	235	70	138	123	114	100	89	222	168	111
Georgia:										
Blairsville	230	68	107	65	51	62	46	176	170	122
Experiment	296	90	84	94	102	91	65	133	127	90
Cairo	121	91	103	112	73	60	85	163	233	141
Mean	216	93	98	90	75	71	65	157	177	118
Mississippi:										
Lorman	181	107	176	(¹)	119	99	82	...	...	...
Meridian	341	105	133	124	126	140	115	...	...	...
Newton	152	112	145	114	93	84	89	...	...	...
Verona	264	113	109	130	105	146	90	...	...	...
Mean	284	109	141	92	111	117	94	...	...	...
Mean of means	235	90	131	102	100	103	81	...	...	...

¹ Failed to boil to sirup of proper density.

TABLE 6.—*Diseases of economic importance in 11 sweet sorghum sirup varieties¹*

Location	Test variety											
	'Brandes' (standard)	'Dale'	'Mer. 67-9'	'Mer. 67-10'	'Mer. 67-11'	'Mer. 67-18'	'Mer. 70-3'	'GA 710 Sy'	'1845E'	'1984E'	'Honey'	
Alabama: Crossville .....		...	...	...	...	...	...	...	...	...	...	...
Florida: Quincy	RS	RS	RS	RS	...	...	...	RS	RS	RS	RS	RS

TABLE 6.—*Diseases of economic importance in 11 sweet sorghum sirup varieties¹*—Continued

Location	'Brandes' (standard)		'Dale'		'Mer. 67-9'		'Mer. 67-10'		'Mer. 67-11'		'Mer. 67-18'		'Mer. 70-3'		'GA 710 Sy'		Test variety	
Georgia:																		
Blairsville	...	...	RS	RS	RS	RS	...	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	A
Cairo	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Experiment	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	A,	RS	RS
Mississippi:																		
Lorman	GLS	...	RS	GLS	...	RS	GLS	...	GLS, RS	GLS	...	...	...	...	...	...	GLS, RS	RS
Meridian	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...	A	A
Newton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	GLS
Verona	GLS	...	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS	GLS

¹ The presence of disease is indicated only when it was severe enough to have caused a reduction in yield or quality.
A, Anthracnose. GLS, Gray leaf spot. R, Rust. RS, Rough spot.

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